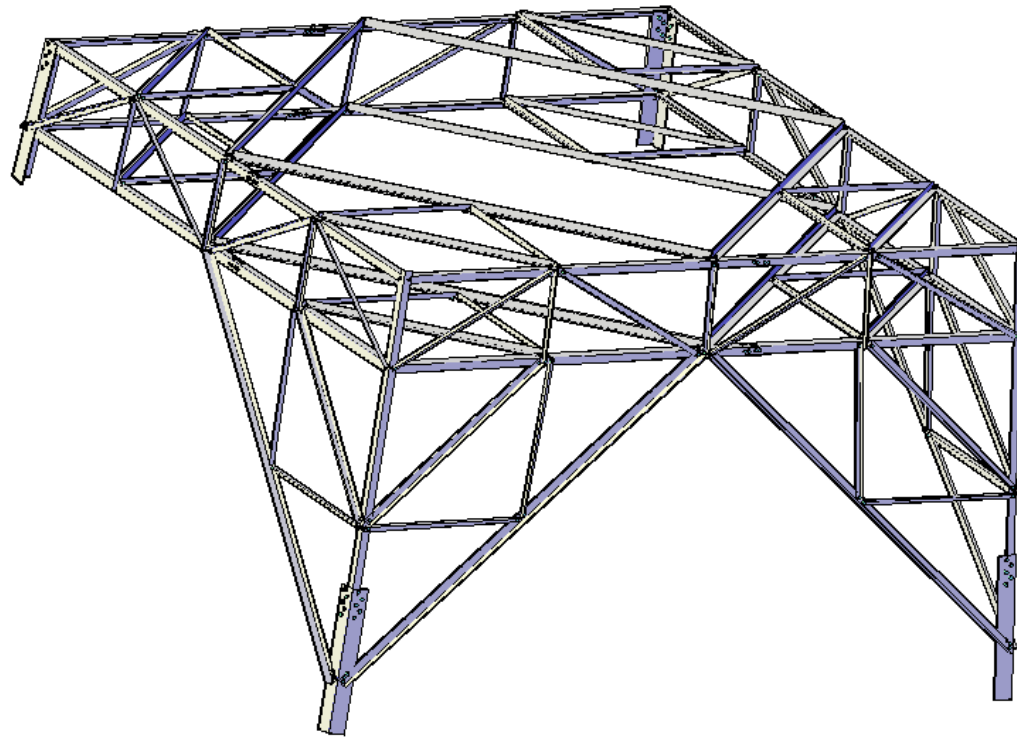


TOWERSMART

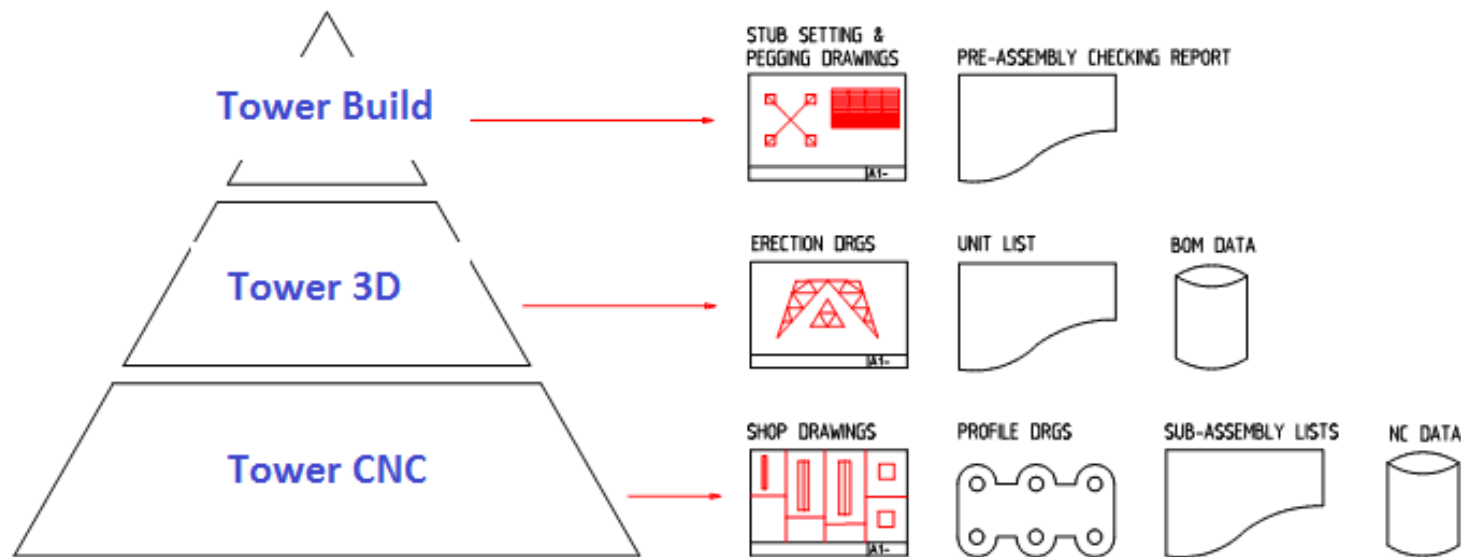
3D Detailing System for Lattice Structures



WHAT IS TOWERSMART

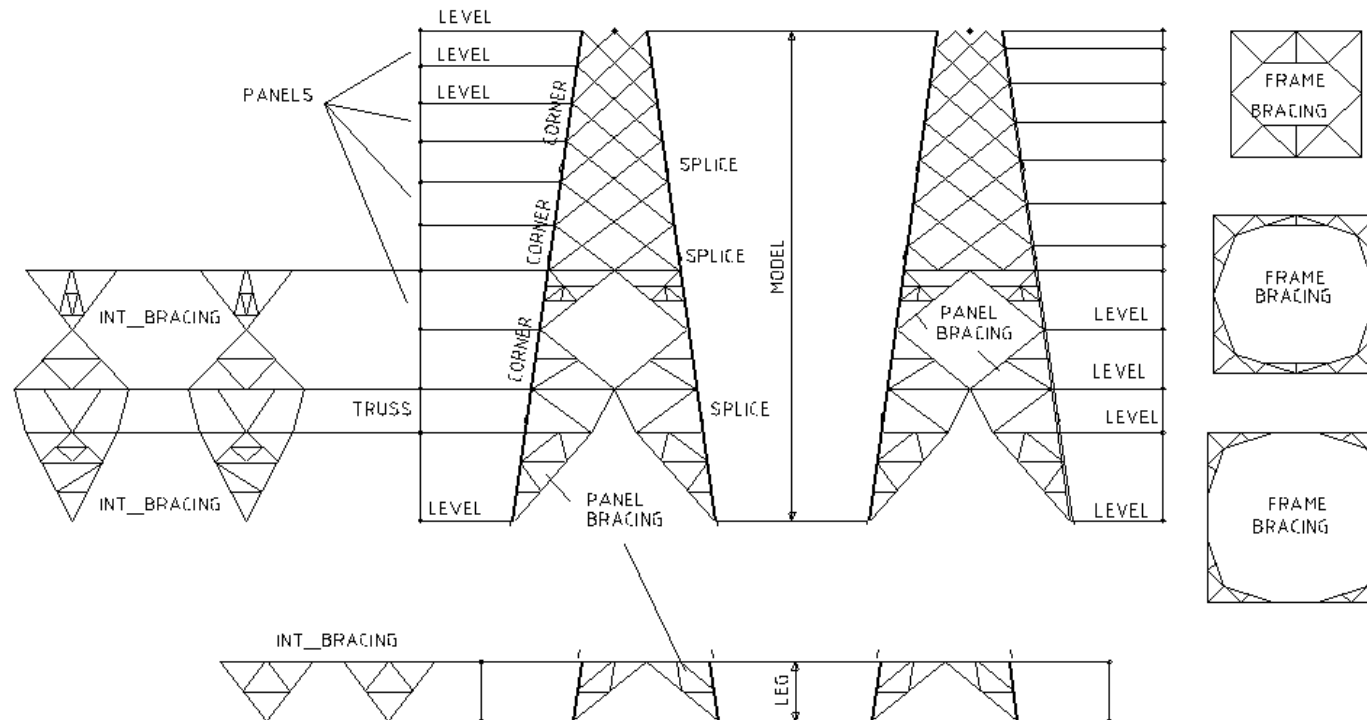
A complete detailing and manufacturing system specifically geared towards lattice type structures. It comprises modular interlinked sub-systems ...

- Tower_BUILD Pre-processor of common structure and panel types
- Tower_3D 3D interactive modelling system with embedded detailing intelligence.
- Tower_CNC Manufacturing data and BOM management system.
- Tower_VP a virtual prototyper that allows the quick build and modifications of structures from manufacturing data.
- Tower_Frame A revolutionary design interface currently being developed jointly by Alupole Australia and Gad Technologies.



TOWER_BUILD

TOWER_BUILD is pre-processor software brought about due to the declining availability of experienced tower detailers, this is a trend occurring not only locally but world-wide. Its aim is to encapsulate tower detailing know-how in an electronic database. The pre-processor requires only basic geometrical input such as overall model dimensions, panel types and heights, member sizes, required bolts, and splice locations.



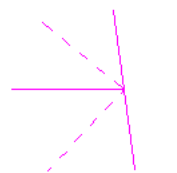
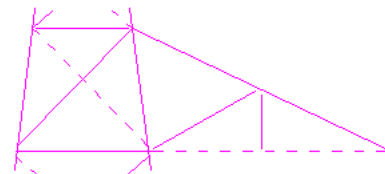
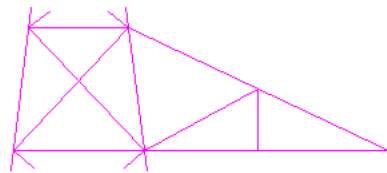
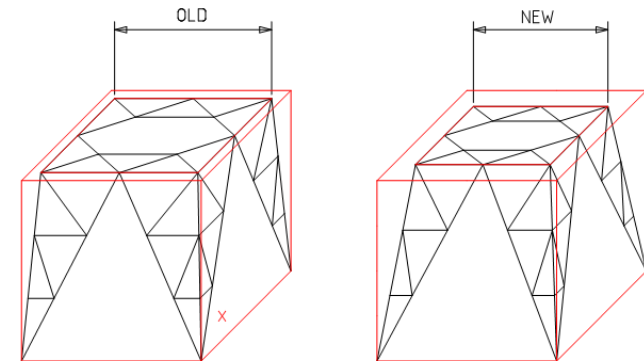
TOWER_3D

TOWER_3D is a fully parametric modeling system with a set of 'smart' routines that can automatically detail any bolted angular connection.

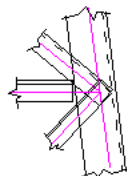
These routines have the 'expert knowledge' of the following functions ...

- Bolt placement (with ability to minimise gusset plates)
- Member notching (with logic to select the best cut solution)
- Member placement (will place members close as possible to node)
- Bolt length determination
- Hidden line removal
- Label placement (mark, section & bolt lengths)

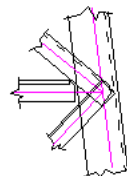
Tower_3D also allows the expert detailer to override any connection with full parametric control



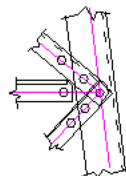
DETERMINE
MEMBER
ORIENTATIONS



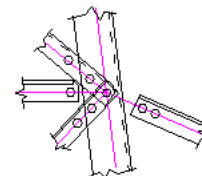
SET
MEMBER
OFFSETS



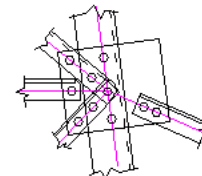
CALCULATE
MEMBER
CUTS



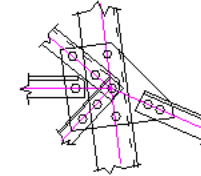
LOCATE
BOLT
LOCATIONS



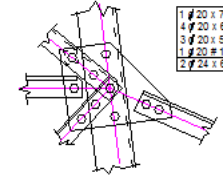
MERGE
OTHER
FACES



CREATE PLATE
EXTRA BOLTS



CALCULATE
PLATE CUTS



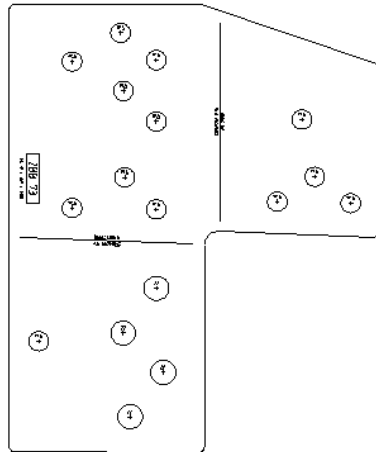
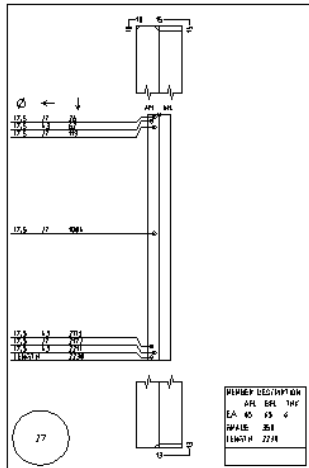
CALCULATE
BOLT LENGTHS

1	# 20 x 70
4	# 20 x 50
3	# 20 x 50
1	# 20 # 12
2	# 24 x 65

TOWER_CNC

TOWER_CNC is software that is used by detailers to control all the manufacturing processes required on steel components of a structure. It will produce a variety of output such as ...

- fabrication drawings (showing drilling, bending, notching etc)
- details can be single (A4/A3 or multiple details per A1/A0 dwg)
- full scale profiles (for plates that need to be flame cut)
- sub-assembly lists (Bill of material lists)
- NC data (as required by various CNC machines)
- CNC viewer is available upon request
- virtual prototyping interface (for quickly rebuilding previous structures)



```
assembly > +-----+
              : SUP MIDDLE : (superstr.middle)
              +-----+

erection_dwg's > list \

MARK_NO: 25 QTY: 2 SECT: PL6 (PL 6) GR: 250 LG: 180*150
MARK_NO: 26 QTY: 8 SECT: PL2 (PL 2) GR: 250 LG: 260*90
MARK_NO: 28 QTY: 4 SECT: 100EA10 (EA100X100X10) GR: 350 LG: 530
MARK_NO: 29 QTY: 2 SECT: 125EA10 (EA125X125X10) GR: 350 LG: 6600
MARK_NO: 31 QTY: 2 SECT: 55EA5 (EA55X55X5) GR: 250 LG: 1810
MARK_NO: 32 QTY: 4 SECT: 65EA5 (EA65X65X5) GR: 350 LG: 2590
MARK_NO: 33 QTY: 2 SECT: 75EA6 (EA75X75X6) GR: 350 LG: 2686
MARK_NO: 34 QTY: 2 SECT: 75EA6 (EA75X75X6) GR: 350 LG: 2686

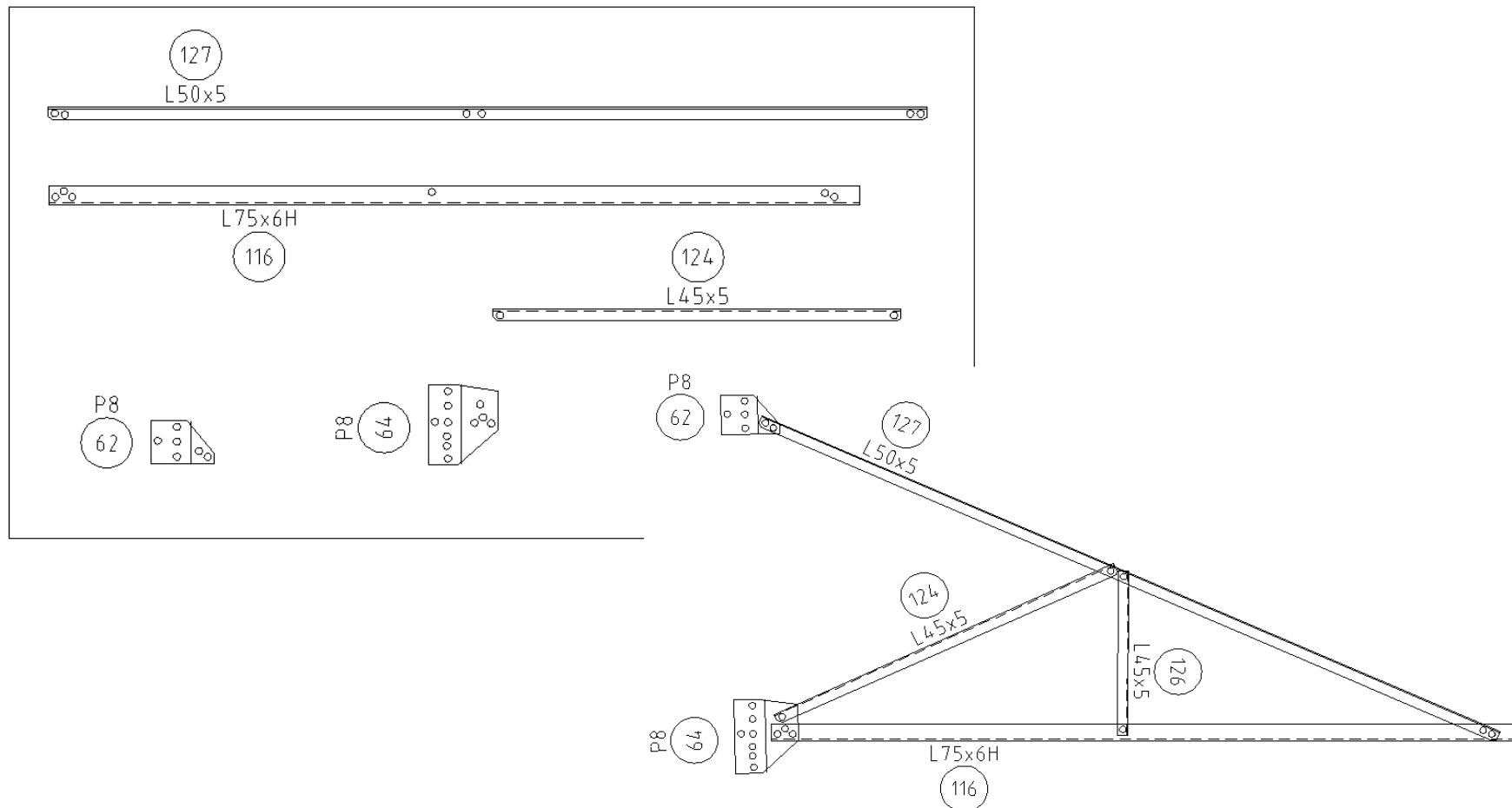
LIBRARY_ITEM: 20XA45 QTY: 16 DESCR: STB20X45
LIBRARY_ITEM: 20XA50 QTY: 188 DESCR: STB20X50
LIBRARY_ITEM: 20XA55 QTY: 108 DESCR: STB20X55
LIBRARY_ITEM: 20YB5 QTY: 532 DESCR: RW20X5
LIBRARY_ITEM: 20YC10 QTY: 10 DESCR: PK20X10.....(N/A)
LIBRARY_ITEM: 20YC8 QTY: 2 DESCR: PK20X8
LIBRARY_ITEM: YA20 QTY: 532 DESCR: NUT20
LIBRARY_ITEM: YG20 QTY: 532 DESCR: SW20

Total of 117 COMPONENTS in this assembly > SUP MIDDLE (superstr.middle)
```

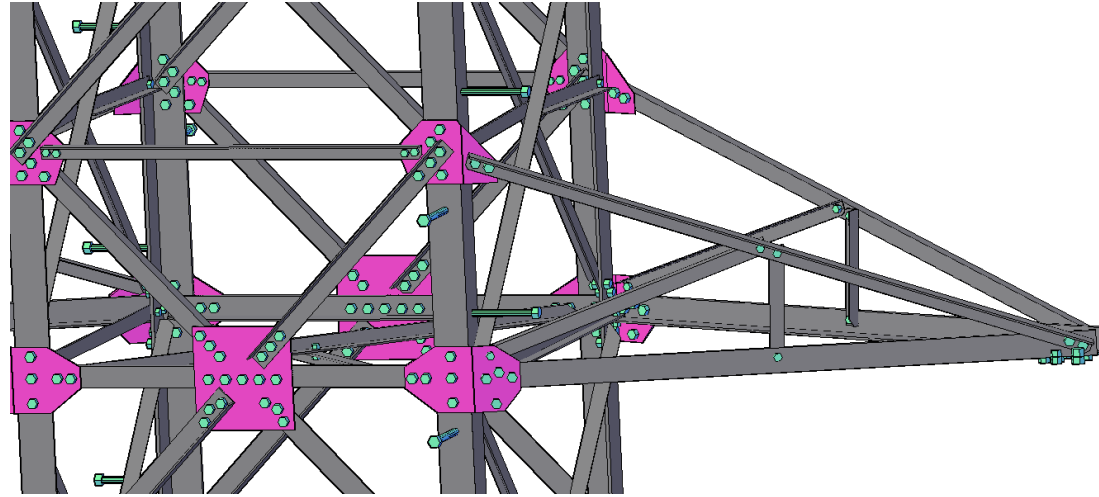
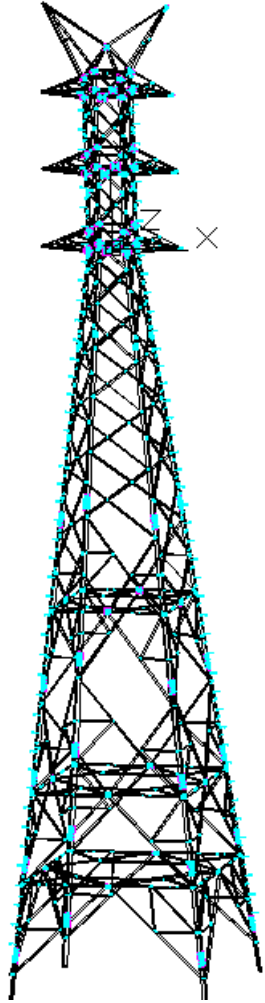
TOWER_VP

The virtual prototyper is a software tool that allows the quick 'virtual prototype' of a pre-built structure from basic TOWER_CNC data.

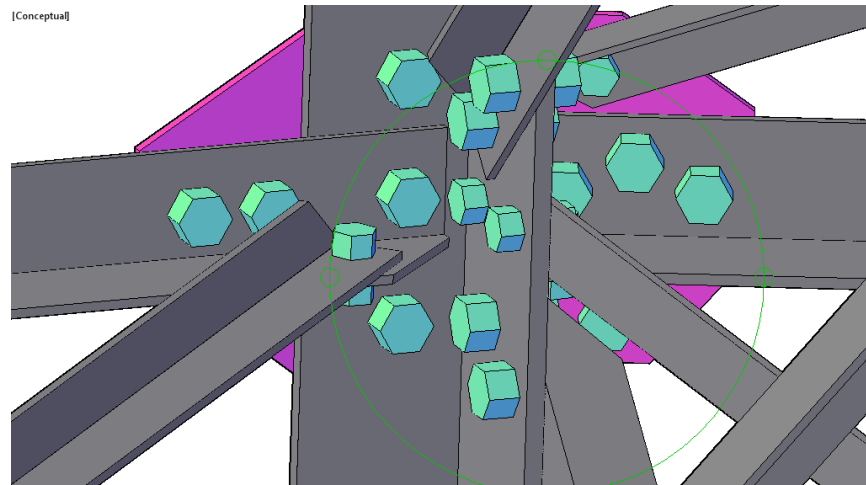
The major benefit is that existing towers can be quickly modified and checked to ensure fit when changing to other section sizes or standards.



TOWERSMART – 3D VISUALIZATION



[Conceptual]



TOWERSMART – LIBRARIES

TowerSmart has numerous libraries and customization files that allows it to quickly adapt to almost any standard or customer requirement.

The setup files are grouped into 2 main categories, libraries and parameter files.

Libraries are specific tables that are used throughout the TowerSmart systems, these are ...

Details Dimensions File (*.DDF)

Section Properties File (*.SEC)

Bolt Lengths File (*.BLT)

Parameter files relate to each specific sub-system and allows further flexibility and customization, these are ...

Tower_Build parameter file (*.OPT)

Tower_3D parameter file (*.OPC)

Tower_CNC parameter file (*.OPD)

Tower_CNC_FORMATS

... parameters for Pre-Processor

... parameters for 3D detailing

... parameters for CAM/CNC interface

... Steel Details configuration file

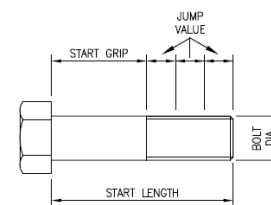
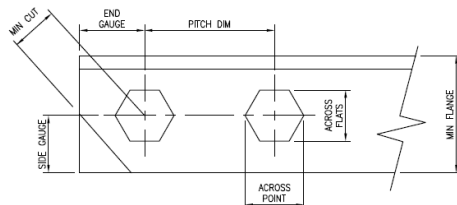
```
FILE >>> EPT.DDF
FOR SIDE_GAUGE > ADD UNDER-ROLL TOLERANCE OF RELEVANT ANGLE SECTION
```

BOLT DIA	ROLE DIA	ACROSS POINTS	ACROSS FLATS	ACROSS HEAD HEIGHT	HEAD HEIGHT	WUT HEIGHT	PITCH DIM	END GAUGE	MIN GAUGE	CUTS GAUGE	SIDE FLANGE	MIN PENTR	SYMBOL	PENCH
10	11.5	18	15	7	9	25	20	16	15	38	16	15		
12	13.5	21	18	8	11	30	20	16	17	38	12	15		
16	17.5	28	24	11	15	40	26	22	21	44	16	18		
20	22.0	35	30	14	18	50	32	26	24	55	20	19		
22	24.0	39	33	15	20	55	35	31	29	75	16	19		
24	26.0	42	36	16	22	60	38	33	31	75	24	19		
30	32.0	53	45	0	0	75	47	43	42	0	16	19		
32	34.0	56	48	0	0	80	50	46	45	0	16	19		

>>> INITIAL_BOLT_LENGTH INFO:

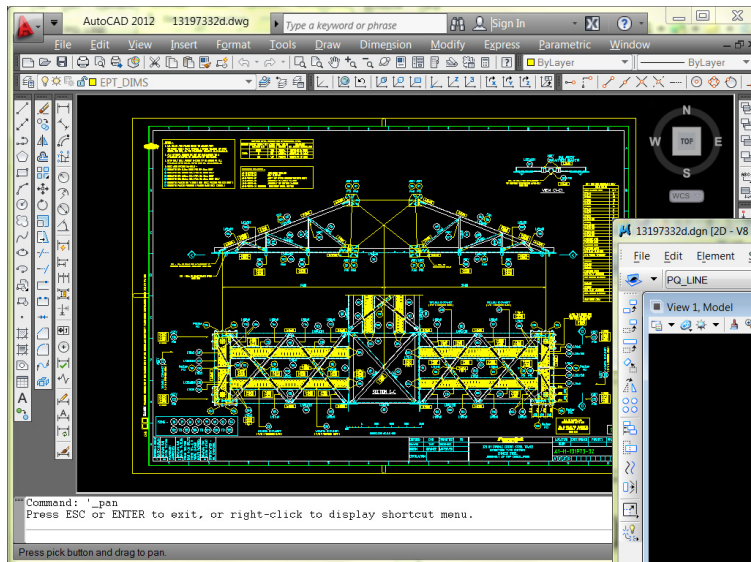
WASHER DESCRIPTION	BOLT DIA	START GRIP	START LENGTH	JUMP VALUE	IF_CALC #3	GAP_BELOW #5	START GRIP #6	START GRIP #8
FLAT	12	10	35	5	7	6		
	14	10	35	5	10	10	10	10
	16	6	35	5	0			
	20	7	40	5	6			
SPRING	24	8	45	5	6			
	12	13	35	5	10	8	7	6
	16	8	35	5	6			
	20	8	40	5	6			
	24	8	45	5	6			

FLAT (0)
 SPRING (1) - CAN BE HEAVY OR FLAT & SPRING OR LOCK NUT

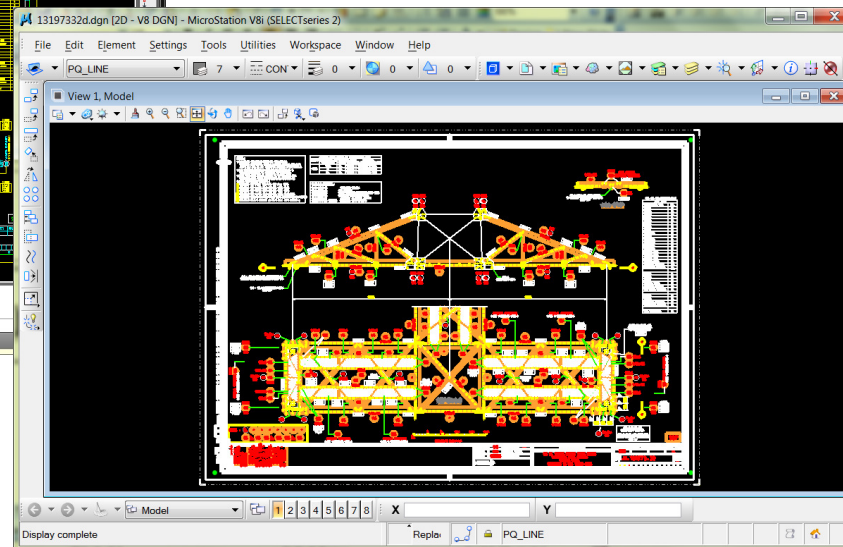


TOWERSMART – CAD FORMATS

Completed drawings can be supplied
in both AutoCad or Microstation Formats



Multiple of converters
available to conform to most
CAD standards



Layers to Levels
Blocks to Cells
Full scale or fit to Format